Contribution ID: **489** Type: **Invited Oral**

M3Or3H-07: [Invited] Fabrication and transport properties of multifilament Cu/Ag/Ba-122 iron-based superconducting wires

Wednesday 12 July 2023 15:25 (15 minutes)

Iron-based superconductors (IBS) are very promising candidates for high-field applications owning to their ultrahigh upper critical field ($Hc2$) and very small anisotropy. For such applications, it is essential to develop multifilamentary superconducting wires with high transport critical current density (Jc). Compared with the tape-sharped multifilamentary wires with high aspect ratio, round- or rectangular-shaped wires are more convenient for the design and fabrication of high-field solenoidal coils. At present, highly dense superconducting filaments can be achieved via hot isostatic press for IBS wires. However, due to the lack of grain texture, the IBS wires made by using the conventional power-in-tube method show much lower Jc than that of tapes. In this work, Cu/Ag composite sheathed (Ba, K)Fe2As2 (Ba-122) 3-, 7- and 11-filament wires were developed with a tape-in-tube method. The wires consist of tape-shaped Ba-122 filament with improved grain alignment, showing a best transport Jc two times higher than that of the conventional power-in-tube wires, indicating that the tape-in-tube process provides a new and promising fabrication route of multifilamentary IBS wires for practical applications. The evolution of the transport Jc, n-values and filament homogeneity for the 3-, 7- and 11-filament wires is systematically investigated in connection of the grain texture, mass redistribution and interface effects. Through 3D x-ray tomographic reconstruction and electron probe micro-analyzer analysis, we found that the filament uniformity and chemical composition homogeneity for the Ba-122 wires can be greatly affected by the interface between the Ba-122 filament and Ag matrix.

Authors: Dr YAO, Chao (Institute of Electrical Engineering, Chinese Academy of Sciences); Mr GUO, Wenwen (Institute of Electrical Engineering, Chinese Academy of Sciences); Mr XIONG, Hao (Institute of Electrical Engineering, Chinese Academy of Sciences); MA, Yanwei (IEE,CAS); WANG, Dongliang (Institute of Electrical Engineering, CAS)

Presenter: WANG, Dongliang (Institute of Electrical Engineering, CAS)

Session Classification: M3Or3H: Special Session: Low Temperature Materials Database A Superconductors